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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/881,335	06/14/2001	Mikko Huttunen	781.401USW1	9195

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EXAMINER

LEE, JOHN J

ART UNIT PAPER NUMBER

2684

DATE MAILED: 04/26/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/881,335

Applicant(s)

HUTTUNEN, MIKKO

Examiner

JOHN J LEE

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-18, 20 and 22-25 is/are rejected.
- 7) ☒ Claim(s) 19 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.7.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 15-18, 20, and 22-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright et al. (US Patent number 6,054,894) in view of Cavers (US Patent number 5,049,832).

Regarding **claim 15**, Wright discloses that a method for defining correction parameters used in transmitter linearization executed by a predistortion method (column 3, lines 49 – column 4, lines 37 and Fig. 3, 26). Wright teaches that taking a predefined number of samples from a signal coming out of said transmitter (Fig. 3, 26, column 6, lines 29 – 67, and column 40, lines 47 – column 41, lines 9, where teaches compensation estimator to extract a sample of the amplified output and samples of the two phase signals). Wright teaches that comparing the signal samples with corresponding ideal signal values (column 38, lines 32 – 67 and Fig. 25, 26, where teaches the receiver converts the RF signal down to complex baseband samples which can be compared with samples of the ideal signal). Wright teaches that defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question (column 38, lines 32 – 67, Fig. 3, and column 6, lines 55 – column 7, lines 65,

where teaches extracting a sample of the amplified output and samples of the two phase signals and identify parameter corrections for each phase signal).

Wright does not specifically disclose the limitation “categorizing the signal samples into classes”. However, Cavers discloses the limitation “categorizing the signal samples into classes” (column 13, lines 8 – column 14, lines 52 and Fig. 11, 12, where teaches the variance in the output quantization error is inversely proportional to the square of the table size with class AB). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Wright system as taught by Cavers. The motivation do so would be to achieve a method of linearizing an amplifier to produce an amplified output sample in response to predistorted input sample for desired constant amplitude gain in communication system.

Regarding **claim 16**, Wright discloses that the categorization in above step is performed on the basis of the ideal signal corresponding to the signal sample (column 38, lines 32 – 67 and Fig. 25, 26).

Regarding **claim 17**, Wright and Cavers disclose all the limitation, as discussed in claim 15. Furthermore, Wright further discloses that above step is performed on the basis of the amplitude of the ideal signal (column 35, lines 11 – 65 and Fig. 23).

Regarding **claim 18**, Wright and Cavers disclose all the limitation, as discussed in claim 15. Furthermore, Wright further discloses that comparing the normalized amplitude of each signal sample of the class in question to the normalized amplitude of the corresponding signal fed into the transmitter (column 39, lines 45 – 58, Fig. 31, 32, and column 45, lines 35 – 58). Wright teaches that defining the ratios of these amplitude

values (column 41, lines 59 – column 42, lines 16 and Fig. 26). Wright teaches that calculating the average of the ratios (column 41, lines 59 – column 42, lines 47 and Fig. 26). Wright teaches that defining the correction parameter for the class in question on the basis of the calculated average (column 41, lines 59 – column 42, lines 47 and Fig. 26).

Regarding **claim 20**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 18. Furthermore, Wright further discloses that calculating the average of the normalized amplitudes of the signal samples of the class in question and the average of the normalized amplitudes of the signals fed into the transmitter and corresponding to the samples of the class in question (column 25, lines 8 – column 26, lines 10 and Fig. 13, 14).

Regarding **claim 22**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 18. Furthermore, Wright further discloses that defining as the correction parameter of the class in question the correction parameter of another class, preferably the correction parameter of the closest class, or defining the correction parameter of the class in question by interpolation from the correction parameters of the closest classes containing samples (Fig. 3 and column 6, lines 33 – column 7, lines 39).

Regarding **claim 23**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 18. Furthermore, Wright further discloses that a predistorter for predistorting the signal to be sent to compensate the nonlinearity of the transmitter (abstract, Fig. 3, and column 3, lines 49 – column 4, lines 37). Wright teaches that defining amplitude and preferably phase correction parameters for each class in question (column 24, lines 39 – column 25, lines 43, Fig. 12, 13, and column 40, lines 58 –

column 41, lines 9, where teaches correcting the amplitude gains and phase parameters of comparison result of the samples), whereby the predistorter is arranged to use said correction parameters when predistorting the signal being transmitted (column 14, lines 38 – column 15, lines 18 and Fig. 10).

Regarding **claim 24**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 18. Furthermore, Wright further discloses that if it is not possible to define a correction parameter for a class, adapted to take a corresponding correction parameter from another class and to define it as the correction parameter for the required class (column 8, lines 53 – column 9, lines 17, Fig. 3, 26, and column 39, lines 18 – 44).

Regarding **claim 25**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 16.

Allowable Subject Matter

3. Claims 19 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record fails to disclose “comparing the normalized amplitude and phase of each signal sample of the class in question with the normalized amplitude and phase of the signal fed into the transmitter and corresponding to the sample respectively, defining the ratios of the amplitude values and differences of the phase values, calculating the average of the ratios of the amplitude values defined and the average of the phase value differences, and defining the correction parameter for the class in

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question on the basis of the calculated averages” as specified in the claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Blauvelt (US Patent number 5,252,930) discloses Predistorter for Linearization of Electronic and Optical Signals.

Park et al. (US Patent number 6,373,902) discloses Linearizing Transmitter in Digital Communication System.

Twitchell et al. (US Patent number 6,519,010) discloses Broadcast Transmission System with Sampling and Correction Arrangement for Correcting Distortion Caused by Amplifying and Signal Conditioning Components.

Any response to this action should be mailed to:

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or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

(703) 308-6606 (for informal or draft communications, please label
"PROPOSED" or "DRAFT").

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John J. Lee** whose telephone number is **(703) 306-5936**. He can normally be reached Monday-Thursday and alternate Fridays from 8:30am-5:00 pm. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, **Nay Aung Maung**, can be reached on **(703) 308-7745**. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

J.L
April 12, 2004

John J Lee



 **NICK CORSARO**
PATENT EXAMINER